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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,189	06/25/2003	Patrick Conti	02GV15654470	4347

27975 7590 02/22/2006

ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST P.A.
1401 CITRUS CENTER 255 SOUTH ORANGE AVENUE
P.O. BOX 3791
ORLANDO, FL 32802-3791

EXAMINER	
LU, ZHIYU	
ART UNIT	**PAPER NUMBER**
2682	

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/606,189	CONTI, PATRICK	
	Examiner	Art Unit	
	Zhiyu Lu	2682	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 June 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 9, Applicant discloses structure of a control transistor being a two-diode circuit. Then following in the dependent claim 10, Applicant disclose the control transistor being a PNP transistor. Though the two-diode circuit is equivalent to the PNP transistor, the circuit cannot use both in the same time. It is indefinite to show specified subject matter that the Applicant is claiming.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura (US2002/0180510) in view of Clifton (US2003/0001787), Ashar et al. (US Patent#3840886) and Ogawa (US Patent#4386327).

Regarding claim 9, Tamura teaches a radio-frequency (RF) switching device (100 of Fig. 1) comprising:

a) an input/output terminal (101 of Fig. 1);

b) a plurality of RF channels (102 and 103 of Fig. 1) connected to said input/output terminal (paragraph 0031); and

c) switching means for selecting one of said plurality of RF channels based upon a switching control signal (abstract), said switching means comprising

a respective control module (Fig. 11C) connected to each RF channel (302 of Fig. 11C), each control module comprising

a control input (CONT of Fig. 11C) for receiving the switching control signal,

a PIN diode (D1 of Fig. 11C) having a cathode connected to said input/output terminal, and an anode, and

a control transistor (Q1 of Fig. 11C) comprising a control terminal connected to said control input (CONT of Fig. 11C), and a first conducting terminal connected to the anode of said PIN diode (D1 of Fig. 11C),

But, Tamura does not expressly disclose the amount of RF channel selection in term of plurality and the first conducting terminal forming a common node between an intersection of an anode of a PN diode formed by the control terminal and the first conducting terminal of said control transistor and a corresponding parasitic PN diode.

Clifton teaches the limitation of a frequency-switching device having a plurality of frequency channels.

Thus, it would have been obvious to one of ordinary skill in the art to put more than two RF channels with respective control modules, in order to provide a plurality of RF frequencies switching.

Ashar et al. teach the limitation of using lateral transistor for low-voltage and fast-switching application (column 5 lines 12-29).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use lateral transistor for control transistor, in order to have low-voltage and fast-switching performance.

Ogawa teaches the limitation of an equivalent of a transistor formed by two diodes (Q20 of Fig. 13, column 3 lines 28-39), which means the control transistor of Tamura is recognized as an equivalent two-diode circuit.

Thus, it would have been obvious to one of ordinary skill in the art to recognize that the first conducting terminal forming a common node between an intersection of an anode of a PN diode formed by the control terminal and the first conducting terminal of said control transistor and a corresponding parasitic PN diode with use lateral transistor taught by Ashar et al. for low-voltage application.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the having more than two RF switching channels taught by Clifton and using lateral transistor taught by Ashar et al. into the RF switching device of Tamura, in order to provide a plurality of RF frequencies switching with low-voltage and fast-switching performance.

Regarding claim 10, Tamura, Clifton, Ashar et al. and Ogawa teach the limitation of claim 9. Tamura teaches the limitation of control transistor comprises a NPN transistor and the control terminal forms the base and the first conducting terminal forms the emitter (Q1 of Fig. 11C), but Tamura, Clifton and Ogawa do not expressly disclose the limitation of control transistor comprises a lateral PNP transistor, and the control terminal forms the base and the first conducting terminal forms the collector of said lateral.

Ashar et al. teach the limitation of using lateral PNP transistor for low-voltage and fast-switching application (column 1 line 32 to column 2 line 3, column 5 lines 12-29).

At the time the invention was made, it would have been to a person of ordinary skill in the art to choose using either PNP transistor or NPN transistor as shown by Ashar et al. Applicant has not disclosed that using a PNP transistor provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with switching circuitry using NPN transistor because they perform exactly the same except operating with opposite polarities. Thus, it would have been obvious to one of ordinary skill in the art to modify the NPN transistor to obtain the invention as specified in the claim.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate using lateral PNP transistor taught by Ashar et al. into the modified RF switching device, remote terminal and method of Tamura and Clifton, in order to obtain low-voltage and faster switching in performance.

3. Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura (US2002/0180510) in view of Clifton (US2003/0001787), Ashar et al. (US Patent#3840886) and Ogawa (US Patent#4386327).

Regarding claim 11, Tamura, Clifton, Ashar et al. and Ogawa teach the limitation of claim 9. Clifton also teaches the limitation of further comprising a substrate, and wherein the switching circuit is formed therein so that the RF switching device is an integrated circuit (paragraph 0036).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the switching circuit of the modified RF switching device of Tamura, Ashar et al. and Ogawa into integrated circuit taught by Clifton, in order to reduce the size of the circuitry.

Regarding claim 12, Tamura, Clifton, Ashar et al. and Ogawa teach the limitation of claim 9. Clifton also teaches the limitation of plurality of RF channels comprise channels dedicated to transmission and channels dedicated to reception (Fig. 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate plurality of frequency channels dedicated to transmission and reception taught by Clifton into the modified RF switching device of Tamura, Ashar et al. and Ogawa, in order to provide plurality of frequency channels as a transceiver.

Regarding claim 13, Tamura, Clifton, Ashar et al. and Ogawa teach the limitation of claim 12.

Clifton also teaches the limitation of dedicated channels support different transmission standards operating at different frequencies (paragraph 0045).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate supporting different transmission standards taught by Clifton into the modified RF switching device of Tamura, Ashar et al. and Ogawa, in order to provide different transmission standard services.

Regarding claim 14, Tamura, Clifton, Ashar et al. and Ogawa teach the limitation of claim13.

Clifton also teaches the limitation of the different transmission standards comprise GSM, PCS, and WCDMA (paragraph 0045).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate supporting different popular transmission standards taught by Clifton into the modified RF switching device of Tamura, Ashar et al. and Ogawa, in order to provide different popular transmission standard services.

4. Claims 15-16, 19-24, 27-34, and 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura (US2002/0180510) in view of Clifton (US2003/0001787).

Regarding claim 15, Tamura teaches a radio-frequency (RF) switching device comprising:

a) an input/output terminal (101 of Fig. 1);

b) a plurality of RF channels (102 and 103 of Fig. 1) connected to said input/output terminal; and

c) a switching circuit (100 of Fig. 1, 402 of Fig. 4) for selecting one of said plurality of RF channels based upon a switching control signal, said switching circuit comprising:

a plurality of control modules (Fig. 11C) connected to said plurality of RF channels (102 and 103 of Fig. 1), each control module comprising:

a diode (D1 of Figs. 1 and 11C) having a cathode connected to said input/output terminal, and an anode, and

a control transistor (Q1 of Figs. 1 and 11C) comprising a control terminal for receiving the switching control signal (CONT of Fig. 11C), and a first conducting terminal connected to the anode of said diode (Fig. 11C).

But, Tamura does not expressly disclose the amount of RF channel selection in term of plurality. Clifton teaches the limitation of a frequency-switching device having a plurality of frequency channels.

Thus, it would have been obvious to one of ordinary skill in the art to put more than two RF channels with respective control modules, in order to provide a plurality of RF frequencies switching.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate having more than two RF switching channels taught by Clifton into the RF switching device of Tamura, in order to provide a plurality of RF frequencies switching.

Regarding claim 23, Tamura teaches a remote terminal for operating in a wireless communication system (paragraph 0001) and comprising:

a) an antenna (401 of Fig. 4);

b) a plurality of RF channels (409 of Fig. 4) connected to said antenna; and

c) a switching circuit (100 of Fig. 1, 402 of Fig. 4) for selecting one of said plurality of RF channels based upon a switching control signal, said switching circuit comprising:

a plurality of control modules (Fig. 11C) connected to said plurality of RF channels (102 and 103 of Fig. 1), each control module comprising:

a diode (D1 of Figs. 1 and 11C) having a cathode connected to said antenna, and an anode, and

a control transistor (Q1 of Figs. 1 and 11C) comprising a control terminal for receiving the switching control signal (CONT of Fig. 11C), and a first conducting terminal connected to the anode of said diode (Fig. 11C).

But, Tamura does not expressly disclose the amount of RF channel selection in term of plurality. Clifton teaches the limitation of a frequency-switching device having a plurality of frequency channels.

Thus, it would have been obvious to one of ordinary skill in the art to put more than two RF channels with respective control modules, in order to provide a plurality of RF frequencies switching.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate having more than two RF switching channels taught by Clifton into the remote terminal of Tamura, in order to provide a plurality of RF frequencies switching.

Regarding claim 33, Tamura teaches a method for making a radio-frequency (RF) switching device (abstract) comprising:

a) connecting a plurality of RF channels (102 and 103 of Fig. 1) to an input/output terminal (101 of Fig. 1); and

b) connecting a switching circuit (inherent) to the plurality of RF channels for selecting one of the RF channels based upon a switching control signal (CONT of Fig. 11C), the switching circuit comprising a plurality of control modules (Fig. 11C) connected to the plurality of RF channels, each control module comprising:

a diode (D1 of Figs. 1 and 11C) having a cathode connected to the input/output terminal (101 of Fig. 1), and an anode, and

a control transistor (Q1 of Figs. 1 and 11C) comprising a control terminal (CONT of Fig. 11C) for receiving the switching control signal, and a first conducting terminal connected to the anode of the diode (Fig. 11C).

But, Tamura does not expressly disclose the amount of RF channel selection in term of plurality. Clifton teaches the limitation of a frequency-switching device having a plurality of frequency channels.

Thus, it would have been obvious to one of ordinary skill in the art to put more than two RF channels with respective control modules, in order to provide a plurality of RF frequencies switching.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate having more than two RF switching channels taught by Clifton into the method of Tamura, in order to provide a plurality of RF frequencies switching.

Regarding claims 16, 24 and 34, Tamura and Clifton teach the limitations of claims 15, 23 and 33.

Tamura also teaches the limitation of the diode comprises a PIN diode (abstract).

Regarding claims 19, 27 and 37, Tamura and Clifton teach the limitations of claims 15, 23 and 33.

Clifton also teaches the limitation of further comprising a substrate, and wherein the switching circuit is formed therein so that the RF switching device is an integrated circuit (paragraph 0036).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the switching circuit of the RF switching device, remote terminal and method of Tamura into integrated circuit taught by Clifton, in order to reduce the size of the circuitry.

Regarding claims 20, 28 and 38, Tamura and Clifton teach the limitations of claims 15, 23 and 33.

Clifton also teaches the limitation of plurality of RF channels comprise channels dedicated to transmission and channels dedicated to reception (Fig. 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate plurality of frequency channels dedicated to transmission and reception taught by Clifton into the RF switching device, remote terminal and method of Tamura, in order to provide plurality of frequency channels as a transceiver.

Regarding claims 21, 29 and 39, Tamura and Clifton teach the limitations of claims 20, 28 and 28.

Clifton also teaches the limitation of dedicated channels support different transmission standards operating at different frequencies (paragraph 0045).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate supporting different transmission standards taught by Clifton into the RF switching device, remote terminal and method of Tamura, in order to provide different transmission standard services.

Regarding claims 22, 30 and 40, Tamura and Clifton teach the limitations of claims 22, 29 and 39.

Clifton also teaches the limitation of the different transmission standards comprise GSM, PCS, and WCDMA (paragraph 0045).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate supporting different popular transmission standards taught by Clifton into the RF switching device, remote terminal and method of Tamura, in order to provide different popular transmission standard services.

Regarding claim 31, Tamura and Clifton teach the limitation of claim 23.

Clifton also teaches the limitation of antenna, said plurality of RF channels and said switching circuit are configured so that the remote terminal is a mobile cellular telephone (paragraph 0045).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate hardware being configured to work in a cellular telephone taught by Clifton into the remote terminal of Tamura, in order to provide cellular phone service.

Regarding claim 32, Tamura and Clifton teach the limitation of claim 23.

Clifton also teaches the limitation of hardware being used in cellular handset (paragraph 0045), where a processor for providing the switching signal to said switching circuit is inherited.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate processor in the terminal taught by Clifton into the remote terminal of Tamura, in order to provide switching signal to the RF switching circuit.

5. Claims 17, 25, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura (US2002/0180510) in view of Clifton (US2003/0001787) and Ogawa (US Patent#4386327).

Regarding claims 17, 25, and 35, Tamura and Clifton teach the limitations of claims 15, 23, and 33.

Tamura teaches the limitation of usage of transistor (Q1 of Fig. 11C).

But, Tamura and Clifton do not expressly disclose the limitation of the first conducting terminal forms a common node between an intersection of an anode of a diode formed by the control

terminal and the first conducting terminal of the control transistor, and a corresponding parasitic diode.

Ogawa teaches the limitation of an equivalent of a transistor formed by two diodes (Q20 of Fig. 13, column 3 lines 28-39), which means the control transistor of Tamura is recognized as an equivalent two-diode circuit and the first conducting terminal forms a common node between an intersection of an anode of a diode formed by the control terminal and the first conducting terminal of the control transistor, and a corresponding parasitic diode.

At the time the invention was made, it would have been to a person of ordinary skill in the art to use two-diode circuit as transistor. Applicant has not disclosed that the first conducting terminal forms a common node between an intersection of an anode of a diode formed by the control terminal and the first conducting terminal of the control transistor, and a corresponding parasitic diode provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with using transistor because they are equivalent.

Therefore, it would have been obvious to one of ordinary skill in the art to modify the modified RF switching device, remote terminal, and method of Tamura and Clifton to obtain the invention as specified in claims 17, 25, and 35.

6. Claims 18, 26, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura (US2002/0180510) in view of Clifton (US2003/0001787) and Ashar et al. (US Patent#3840886).

Regarding claims 18, 26, and 36, Tamura, Clifton and Ashar et al. teach the limitations of claims 15, 23, and 33.

Tamura teaches the limitation of control transistor comprises a NPN transistor and the control terminal forms the base and the first conducting terminal forms the emitter (Q1 of Fig. 11C), but Tamura, Clifton and Ashar et al. do not expressly disclose the limitation of control transistor comprises a lateral PNP transistor, and the control terminal forms the base and the first conducting terminal forms the collector of said lateral.

Ashar et al. teach the limitation of using lateral PNP transistor for low-voltage and fast-switching application (column 1 line 32 to column 2 line 3, column 5 lines 12-29).

At the time the invention was made, it would have been to a person of ordinary skill in the art to choose using either PNP transistor or NPN transistor as shown by Ashar et al. Applicant has not disclosed that using a PNP transistor provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with switching circuitry using NPN transistor because they perform exactly the same except operating with opposite polarities. Thus, it would have been obvious to one of ordinary skill in the art to modify the NPN transistor to obtain the invention as specified in the claim.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate using lateral PNP transistor taught by Ashar et al. into the modified RF switching device, remote terminal and method of Tamura and Clifton, in order to obtain low-voltage and faster switching in performance.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zhiyu Lu whose telephone number is (571) 272-2837. The examiner can normally be reached on Weekdays: 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on (571)272-7882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Zhiyu Lu ZL
February 6, 2006

NAY MAUNG
SUPERVISORY PATENT EXAMINER